

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

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**PCT**

**NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

(PCT Rule 71.1)

|                                     |            |
|-------------------------------------|------------|
| Date of mailing<br>(day/month/year) | 23.08.2004 |
|-------------------------------------|------------|

**IMPORTANT NOTIFICATION**

Applicant's or agent's file reference  
9804.02/PC/PC

|  |  |  |
|--|--|--|
| International application No.<br>PCT/SG 03/00065 | International filing date (day/month/year)<br>28.03.2003 | Priority date (day/month/year)<br>30.05.2002 |
|--|--|--|

Applicant  
**HYDROBALL TECHNICS PTE LTD**

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

**4. REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCTAB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(6), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the International Preliminary Examining Authority:



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**PATENT COOPERATION TREATY**  
**PCT**  
**INTERNATIONAL PRELIMINARY EXAMINATION REPORT**  
**(PCT Article 36 and Rule 70)**

|   |  |  |
|---|--|--|
| Applicant's or agent's file reference<br>9804.02/PC/PC  | <b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/APEA416) |  |
| International application No.<br>PCT/SG 03/00065  | International filing date (day/month/year)<br>28.03.2003   | Priority date (day/month/year)<br>30.05.2002 |
| International Patent Classification (IPC) or both national classification and IPC<br>F2BG1/12 |  |  |
| Applicant<br>HYDROBALL TECHNICS PTE LTD   |  |  |

1. This International preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
  - This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.
3. This report contains indications relating to the following items:
  - I  Basis of the opinion
  - II  Priority
  - III  Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - IV  Lack of unity of invention
  - V  Reasoned statement under Rule 60.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
  - VI  Certain documents cited
  - VII  Certain defects in the international application
  - VIII  Certain observations on the international application

|   |  |
|---|--|
| Date of submission of the demand<br>19.08.2003  | Date of completion of this report<br>23.08.2004                          |
| Name and mailing address of the International Preliminary Examining Authority:<br><br><br>European Patent Office - P.O. Box 5810 Patentkantoor 2<br>NL-2280 HV Rijswijk - Pays Bas<br>Tel. +31 70 340 - 2040 Fax: +31 851 890 01<br>Fax: +31 70 340 - 3010 | Authorized Officer<br><br>Van Dooren, M<br>Telephone No. +31 70 340-4097 |

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/SG 03/00085

**I. Basis of the report**

1. With regard to the elements of the International application (Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17));

**Description, Pages**

1-13                          as originally filed

**Claims, Numbers**

1-8                          filed with telefax on 05.04.2004

**Drawings, Sheets**

16-86                          as originally filed

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description,        pages:
- the claims,              Nos.:
- the drawings,            sheets:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/SG 03/00065

5.  This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).  
*(Any replacement sheet containing such amendments must be referred to under Item 1 and annexed to this report.)*

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

|                               |                    |     |
|-------------------------------|--------------------|-----|
| Novelty (N)                   | Yes: <u>Claims</u> | 1-8 |
|                               | No: <u>Claims</u>  |     |
| Inventive step (IS)           | Yes: <u>Claims</u> | 1-8 |
|                               | No: <u>Claims</u>  |     |
| Industrial applicability (IA) | Yes: <u>Claims</u> | 1-8 |
|                               | No: <u>Claims</u>  |     |

2. Citations and explanations

see separate sheet

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/SG 03/00065

**Re item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Document DE-B-1247359, which is considered to represent the most relevant state of the art, discloses a system for cleaning tubing, from which the subject-matter of independent claim 1 differs in that the separator comprises rectangular perforations and that the system comprises means to rotate the fluid and the cleaning balls at the outlet pipe and cooperating with said rectangular slots of the separator for increasing the number of collisions between the cleaning balls.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as to remove more dirt accumulated on the surfaces of the cleaning balls after their passage through the tubing.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) as it is not known from, nor rendered obvious over the prior art.

Claims 2 - 8 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

## CLAIMS

1. A system for cleaning tubing used for conducting a fluid therethrough, the tubing being connected to an inlet pipe (5) and an outlet pipe (9), the system having:
  - a plurality of cleaning balls (20) for circulating with the fluid through the tubing;
  - a separator (12) disposed at the outlet pipe (9) and arranged to separate the cleaning balls (20) from the fluid, said separator comprising perforations which allow the fluid to flow through but not the cleaning balls (20);
  - a recirculating means comprising:
    - a housing (21) arranged to collect the cleaning balls (20), the housing (21) having a first compartment (19) and second compartment (27) separated by an apertured partition (28), the apertured partition (28) being arranged to allow the fluid to pass through to the second compartment (27) but not the cleaning balls (20);
    - a ball supply pipe (24) having an entrance (26) coupled to a first opening on the first compartment (19) of the housing (21) and an exit (3) coupled to a first opening on the inlet pipe (5);
    - a fluid supply pipe (23) having an entrance (2) coupled to a second opening on the inlet pipe (5) and an exit (22) coupled to a second opening on the first compartment (19) of the housing (21);
    - a fluid return pipe (16) having an entrance (30) coupled to an opening on the second compartment (27) of the housing (21) and an exit (14) coupled to an opening on the outlet pipe (9);
    - a ball return pipe (17) having an entrance (13) coupled to an opening on the separator (12) and an exit (31) coupled to a third opening on the first compartment (19) of the housing (21);
    - a means for supply of cleaning balls to the inlet pipe (5) whereby a high pressure is formed at the entrance (2) of the fluid supply pipe (23) and a low pressure is formed at the exit (3) of the ball supply pipe (24), the difference in pressure causing a transfer of cleaning balls (20) from the housing (21) to the inlet pipe (5);
    - and a means for a return of cleaning balls (20) to the housing (21) whereby a high pressure is formed at the entrance (13) of the ball return pipe (17) and a low pressure is formed at the exit (14) of the fluid return pipe (16), the difference in pressure causing a transfer of cleaning balls (20) from the separator (12) back to the housing (21), wherein said recirculating means, said means for supply of cleaning balls and said means for return of cleaning balls are arranged to selectively transfer the plurality of cleaning balls (20) from the inlet pipe (5) to the outlet pipe (9), characterized in that said separator (12) comprises rectangular perforations (32) which allow the fluid to flow through but not the cleaning balls (20) and in that said system further comprises means (10) to rotate the fluid and the cleaning balls (20) at the outlet pipe (9) before the separator (12) and cooperating with said rectangular slots (32) for increasing the number of collisions between said cleaning balls (20) so as to remove the dirt accumulated on the surfaces of the cleaning balls (20) after their passage through the tubing (8).
2. A cleaning system according to claim 1, wherein the recirculating means further comprises a first valve (V1) disposed along the fluid supply pipe (23), a second valve (V2) disposed along the fluid return pipe (16), a first one-way valve (CV1) disposed along the ball supply pipe (24), and a second one-way valve (CV2) disposed along the ball return pipe (17); the first one-way valve (CV1) being operative to transfer the cleaning balls (20) from the housing (21) to the inlet pipe (5) and the second one-way valve (CV2) being operative to transfer the cleaning balls (20) from the separator (12) to the housing (21).

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